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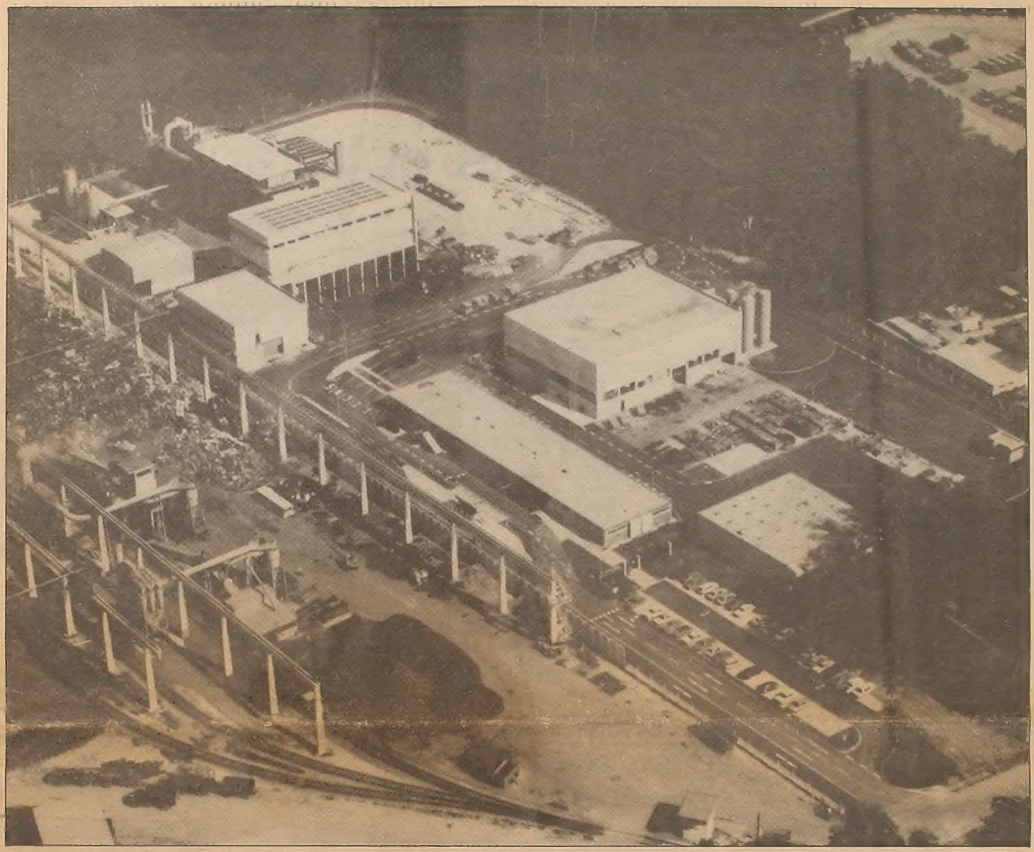

European example

Aerial view of the Ebenhausen industrial waste treatment plant in Bavaria. The plant, in operation since 1970, incorporates some of Europe's most advanced industrial waste treatment technology. It is one of three establishments visited by Environment Minister Harry C. Parrott, ministry experts and members of the Legislature's Standing Resources Development Committee in January. For a detailed description of the Bavarian operation see pages 6 and 7.

(photo: courtesy Government of Bavaria)

ENVIRONMENT ONTARIO — LEGACY

Vol. 9, No. 5. January-February 1981

Government Publications

LEGACY FEB 13 1981 University of Toronto

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POSTMASTER: IF ADDRESSEE HAS MOVED DO NOT FORWARD BUT RETURN WITH PRESENT ADDRESS IF KNOWN

Clive Addison LEG
University of Toronto
Simcoe Hall
Toronto Ontario M5S 1A1 Canada

Legislature committee members visit European waste facilities

Members of the Ontario legislature's Standing Resources Development Committee made a flying tour of liquid industrial waste treatment facilities in three European countries in early January prior to the committee's review of Environment Minister Harry C. Parrott's policy on industrial wastes.

The MPPs participating in the tour were: Osie Villeneuve, Robert Eaton, Jack Johnson, James Taylor (all PC), Murray Gaunt and Jack Ridell (Liberals).

The tour of facilities in England, West Germany and Denmark was intended to provide information on these advanced treatment facilities as they relate to Environment Ontario's proposal to establish an Ontario Waste Management Centre in South Cayuga.

The members of the Committee visited the Stablex solidification facility operated at the Thurrock Waste Management and Land Reclamation Centre near London, the operation of the Gesellschaft zur Beseitigung von Sondermuell in Bayern GmbH in Bavaria and the Kommunekemi/Chem Control A/S facilities in Nyborg, Denmark. (For a report on the GBS treatment complex see pages 6 and 7.)

At the end of November 1980, Dr. Parrott proposed the establishment of a technically advanced $60 million facility for the treatment and disposal of liquid industrial and toxic wastes to be built and operated by a Crown corporation.

Dr. Parrott proposed a large government owned tract of land in South Cayuga as the site of what is planned as the most advanced liquid waste treatment facility in North America.

The minister's proposal was based on earlier recommendations of the resources development committee following a 1978 review on liquid industrial waste and on two reports prepared for the ministry by the consulting firm of MacLaren Planners and Scientists Inc.

In their first desk top study, MacLaren engineers eliminated areas in Southern Ontario within five miles of any city, town or village, provincial and federal parks, all Indian reservations, conservation authority land, flood land, ecologically sensitive land and Class 1 and Class 2 agricultural land.

After the application of these criteria, "there wasn't much of the province left," one of MacLaren's engineers said.

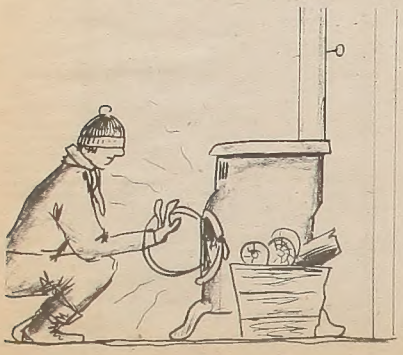
The MacLaren report initially identified 17 candidate regions and subsequently short-listed these to five sites as locations suitable for a liquid industrial waste treatment and disposal facility.

Last June Dr. Parrott requested MacLaren to assess two sites — government-owned land in South Cayuga and at Camp Borden in addition to the five previously identified sites, one each in Lambton, Huron and Bruce Counties and two sites in Simcoe County.

(continued on pg. 3)

It's all one world...

Burning wood emits pollutants



As romantic as woodstoves may be, they still are the most dangerous polluting domestic devices known to modern man, reports the British New Scientist. They also are highly inefficient in their consumption of energy.

The British Forestry Commission, for example, points out that the energy content of 1.25 tonnes of dried hardwood occupying four cubic metres of space can produce as much heat as one tonne of coal occupying 0.25 cubic metres or 1/16 of the space. Poplar, willow and softwood give out even less heat.

A three-bedroom house heated entirely by wood-burning stoves needs three hectares of woodland, of which 0.2 ha must be cut and processed annually. About 100,000 houses of this type would consume the total forestry production of England and Scotland.

North America's forests could support only 10 to 20 per cent of total energy demand. To provide more, "energy farms" would have to be planted. Such farms would have to produce wood in the same intensively chemical-dependent and energy-consuming way agriculture is operated in the Western world.

At this time, growing costs of oven-dried wood run to about $25 (U.S.) per ton. A further $20 to $30 must be added for harvesting, transportation and processing even the most accessible timber.

Only Canada, the Soviet Union and tropical South America have a reasonable hope of being able to sustain an economic supply of wood for fuel.

much the same carcinogens

Possibly more serious than their effect on the energy balance is the environmental effect of wood-burning stoves. They produce negligible amounts of sulphur dioxide, and the carbon dioxide they produce could be balanced by the carbon dioxide consumption of fuelwood plantations.

But burning wood produces much the same carcinogenic or suspected carcinogenic substances as burning cigarettes, among them benzopyrene, dibenzanthracene, benzofluoranthene, dibenzopyrene, chrysene, and others. In addition, "efficient" wood-burning stoves, designed to burn the fuel slowly and at low temperatures, have a much higher rate of emission than less efficient older types.

In comparing the burning of coal in industrial boilers and wood in domestic stoves the U.S. Environmental Protection Agency found that wood burning causes more serious pollution than anything but a dirty, smokey coal fire.

The effect is compounded as industrial users of fuel can be required by law to clean waste gases and remove particles from their discharges. Domestic users, however, can be hardly compelled to install flue scrubbers and electrostatic precipitators in their chimneys, even if such devices could be made to work in such a limited space.

In Britain, New Science concludes, there is hope that the spread of home heating by woodstove will be controlled, not by law but by the availability of fuel.

At this time fuel wood is mostly provided from diseased elm trees. In a year or two, this supply will be exhausted. Wood stove users will then have either to turn to expensive imported wood, or just keep their stoves as "a piece of decorative, but quite useless, ironmongery" in their living rooms.

Economic recession to bring more controls

Industrialists believe that environmental protection measures will not only remain but may become even more stringent in times of economic stress, states John Elkington in his new book, The Ecology of Tomorrow's World: Industry's Environment.

Elkington is an environmental consultant with a thorough knowledge of many U.S. industrial corporations and their attitude toward pollution control. In numerous talks with U.S. business leaders he found that most large companies believe their prosperity depends on their appreciation of the circumstances in which they must function, and have become sensitive to environmental problems.

There are, however, some companies which behave impeccably in their home country but are lax in their overseas operations. In other cases, manufacturers may comply strictly with environmental regulations, but the transporters of their products may not.

In his study of environmental regulations Elkington found that rigid standards, as they are applied in U.S. environmental legislation, often lead to protracted litigation with little benefit to industry and the environment. Flexible systems based on guidelines and objectives, often achieve more, he says.

Environmental assessment, if taken seriously, can be made into a valuable tool for the prediction and forestalling of trouble.

Niagara sewage plant

With the start-up of its renovated sewage treatment plant in mid-December 1980, Niagara Falls, N.Y., stopped dumping untreated sewage into the Niagara River. The plant has a capacity to process 15 million litres (3.3 million imperial gallons) of raw sewage per day.

St. Helen's ash

The silica content of ash emitted by Mt. St. Helen during its recent volcanic eruptions can cause a lung disease similar to asbestosis, reports the U.S. National Institute for Occupational Health.

The institute is not only worried about the ash, but also about discrepancies in silica content analyses it has received from various laboratories.

While some report a silica content of 3 to 12 per cent, others found no silica or only 3 per cent. A reliable determination of silica content of the ash is important for the protection of loggers.

Larger dams

The world's largest dam does not store water or produce electricity. It was built in Arizona to hold tailings from several large mines. The growing use of coal will call for the construction of more such structures in the near future, reports the International Commission on Large Dams.

But dams of this type are generally built without engineering studies by inexperienced miners, and pose a serious hazard to surrounding areas. A dam holding spoil from a coal mine collapsed 10 years ago in West Virginia, killing 125 people.

Tailings dams are not subject to regulations governing the construction of water dams.

Clean water for all by 1990

The World Health Organization estimates that some 25 million people die every year from diseases caused by unclean or inadequate water supply and by lack of sanitation. Half of the population of the Third World does not have safe water to drink, three quarters have no sanitation.

To improve the situation, the UN General Assembly has declared the 80s as the International 'Drinking Water Supply and Sanitation Decade with the aim of bringing clean water and sanitation to all by 1990.

A good supply of clean water would not only reduce mortality, but also have far-reaching economic implications. In many areas one member of the family has to spend all his energy every day just to carry the family's water supply.

In other areas schools are normally closed in the morning in dry season to allow village children to haul water.

To achieve the UN goal, 1.8 billion people will have to be reached with clean water supplies and 2.4 billion with sewage facilities. The costs of such projects are staggering. The World Bank estimates that the price of clean water and sanitation for all would lie between $300 and $600 billion over 10 years.

Studies done on the subject show that providing clean water by itself does not reduce substantially the incidence of diseases. Waterborne diseases are more often spread by a lack of hygiene caused by a shortage of water, by improperly washed hands and dirty pots and other containers.

A World Bank report indicates that most health benefits can be attained at service levels of 30 to 40 litres of water per capita per day on site, and that easy access to water is more important than its microbiological or chemical quality.

The introduction of sewage services faces other difficulties. Studies by the International Development Research Centre in Ottawa show that an improved pit latrine together with good health education can reduce the incidence of disease at the lowest cost.

The problem is to convince Third World planners that it is not absolutely necessary to follow the example of the West and build expensive sewage treatment systems.

Another problem lies in the fact that, even if proper sewage facilities are financed and built, their maintenance is not kept up, and financial support for maintenance is unlikely.

$1.6 billion for cleanup

In one of his last acts as U.S. president, Jimmy Carter signed legislation that will provide $1.6 billion for the cleanup of toxic waste disposal sites such as the Love Canal in New York and the Valley of the Drums in Kentucky.

The new law authorizes the government to recover costs from companies found responsible for dumps and spills. A total of $1.38 billion will be financed by industry through a series of levies applied to oil, feed grain and some other substances.

Ministry of the Environment
Ontario

Hon. Harry C. Parrott, D.D.S., Minister
Graham W.S. Scott, Q.C., Deputy Minister

Published bi-monthly by the Ministry of the Environment, Information Services Branch, 135 St. Clair Avenue West, Toronto, Ontario, M4V 1P5 for those interested in the many facets of environmental enhancement. Reproduction of articles authorized without further permission. Second Class Mail Registration Number 4168

Editor .....Robert Koci

Director of Information Services .....R.J. Frewin

Ontario acts on industrial waste

At present, there are insufficient facilities in Ontario for the treatment and disposal of hazardous industrial wastes. Such wastes include explosive, flammable, volatile and radioactive materials, toxic and disease-causing wastes. Radioactive materials, however, are the sole responsibility of federal authorities and will not be treated at the planned Ontario treatment and disposal site.

Improper storage, collection and disposal of such hazardous wastes present a very real threat to the well-being of Ontario residents and to the environment. By its decision to establish the facility, the Government of Ontario has accepted the responsibility to control industrial waste disposal as quickly as possible.

In 1979 some 60 million gallons of liquid industrial wastes were generated and disposed of by Ontario's industries. An undetermined volume of these wastes was also treated, recycled or stored privately. By 1985 an estimated 75 to 80 million gallons of liquid industrial wastes will be generated each year in Ontario.

40% organic

Most of these wastes are produced by industries located in the Golden Horseshoe (Oshawa to Niagara Falls), in the Stratford-Guelph-Cambridge triangle and in the vicinity of Sarnia, Windsor and St. Thomas.

Approximately 40 per cent of these wastes are organic and can be treated by burning at a high temperature. The remainder are inorganic and can be treated by a combination of physical and chemical processes. A few wastes of particular concern, such as PCBs, some pesticides and chlorinated hydrocarbons require special treatment and research is continuing to determine whether better treatment methods can be developed for these substances. About 10 to 20 per cent of all liquid industrial wastes are considered to be hazardous.

Incineration and physical-/chemical treatment change the nature of the wastes so as to detoxify them and to stabilize their physical and chemical properties. After treatment, however, substantial volumes of solids and/or liquids remain for disposal.

a dozen landfill sites

In 1980 only one-third of Ontario's liquid industrial wastes received proper treatment. These are the organic wastes being incinerated by the Tricil Corporation near Corunna, Ontario. Fully one-half of all liquid industrial wastes, mostly inorganics, were landfilled in a dozen or so sites, most of which are not properly engineered by today's standards. A further one-tenth (organics and inorganics) are exported to New York for treatment and disposal, one-tenth (oily waters) are used for dust control in pits and quarries, and a small quantity is recycled through the Canadian Waste Materials Exchange. These amounts are apart from the quantities of waste treated and recycled by waste producers themselves.

Until October 1978 the Ontario Government's policy was to regard the treatment and disposal of liquid industrial wastes and hazardous wastes as a private sector responsibility.

The role of the Ministry of the Environment was to ensure waste disposal practices posed no threat to health or to the environment, and to provide assistance in the development of waste disposal technology.

government involved

With the seven-point program announced in October 1978 by Dr. Parrott, the government moved toward direct involvement in the management of liquid industrial wastes.

Under this program, the Ministry of the Environment entered into an agreement with two private companies as a co-proponent in obtaining approval under The Environmental Assessment Act to construct and operate two liquid industrial waste solidification plants.

It was hoped that these facilities could receive quick approval to meet the immediate need for interim disposal facilities until a more comprehensive long-term program could be developed.

Faced with continuing delays in proceeding through the appropriate hearings, however, the Government of Ontario has decided to take direct responsibility for the treatment and disposal of liquid industrial and hazardous wastes.

public hearings determine safety

In the new Ontario Government action program, a crown corporation will develop and operate the new waste management centre on the proposed site in South Cayuga following public hearings to determine the safety and suitability of the site.

Assuming approval, the corporation will:

- construct and operate as soon as possible a secure landfill site, a solidification plant, special storage and laboratory facilities for waste analysis;
- eventually construct and operate an incinerating unit and/or other treatment facilities as necessary at the same site;
- consider the establishment of waste collection depots in Northern and Eastern Ontario.

The board of the new Corporation will:

- participate in special public hearings to determine the safety and suitability of the site and later review plans for specific facilities as they are developed;
- oversee all activities of the corporation;
- commission detailed studies to confirm the site hydrogeology and to determine precise site location and layout.

Improved Waybill System:

Regulations made under The Environmental Protection Act for the tracking of wastes are being revised to include:

- monitoring of all liquid industrial wastes and all hazardous wastes, solid and liquid;
- registration of all waste generators and their waste streams;
- mandatory analysis of wastes and direction of wastes to specific types of treatment and disposal technologies;
- ticket-like fines for minor infractions of waybill regulations.

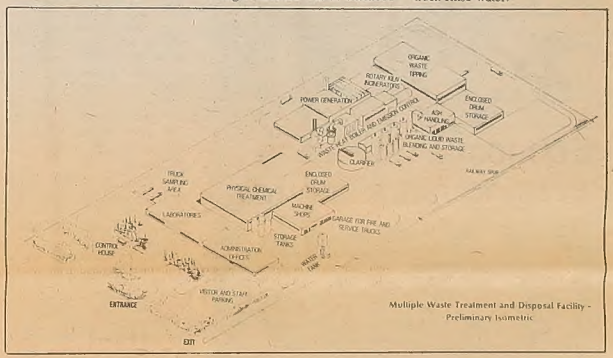
Landfilling of liquid industrial wastes will be prohibited as soon as other facilities of handling these wastes are available.

A 13-man environmental policing unit will investigate and prosecute cases of illegal dumping of industrial and other hazardous wastes. Amendments to Ontario's environmental legislation will set substantial minimum fines for any illegal handling and dumping of industrial wastes and will empower the ministry to revoke permits and to seize vehicles involved in such activities. The ministry's legal staff is being expanded to handle the increased number of prosecutions and control orders. The period within which charges may be laid subsequent to an offence being committed will be extended to two years from the current six months.

New legislation is being prepared to provide an assured source of funding for maintenance and monitoring, in perpetuity, of all facilities handling municipal solid wastes, liquid industrial wastes or hazardous wastes.

Research and Development:

The Ministry of the Environment will continue its involvement in the research and development of new waste treatment and disposal technology. In 1980, $1 million was committed to diverse research projects, including investigation of plasma arc and plasma torch treatment; chemical destruction of PCB, distillation and recycling of truck rinse water.



Multiple Waste Treatment and Disposal Facility - Preliminary Isometric

Committee visits...

(continued from pg. 1)

The two sites in Huron County and South Cayuga were given priority ratings and were considered by MacLaren "viable locations for the proposed facilities subject to their geological suitability being confirmed by field studies."

South Cayuga offered an additional advantage of being close to waste generators and of being largely government owned.

"I believe the fact that the government already owns much of the site is another major plus," Dr. Parrott said. "This allows adequate government control of the site; a buffer zone can easily be achieved; and there will be minimal disruption of existing land use to any residents."

Before the decision, soil tests were carried out in South Cayuga by the engineering and hydrogeological firm of Morrison and Beatty Ltd. The firm reported that "the site appears to be ideally suited."

To become the province's permanent liquid industrial waste treatment facility, the site will have the best available technology and will operate under the highest standards, according to the minister.

"An important aspect of government ownership means we can fully accept the responsibility as a government for the operation of the site," Dr. Parrott said.

Following MacLaren's recommendation, the site will be 100 acres in size with a buffer zone of 640 acres.

Dr. Parrott also advised the co-proponents at Thorold and Harwich that the ministry is withdrawing its participation from these short-term proposals. Legal obligations concerning these sites, however, would be met.

Other features of the South Cayuga facility named by Dr. Parrott are:

- the Ontario Waste Management Corporation will be responsible for the operation of the facility and supervise round-the-clock security.
- laboratory facilities in place will assure that no wastes enter before their contents are fully known.
- no radioactive material will be accepted.
- the Province will assume the cost of upgrading or construction of necessary roads to reduce the transportation risks to a minimum.
- the ministry will continue to fund research into alternative technologies. These will be incorporated where appropriate.
- the site will be operated on a break even basis. The users fees will act as an incentive to encourage industry to reduce, recycle or re-use their wastes.

The board will also investigate other ways to reduce waste volumes and encourage waste exchange programs.

The newly formed Ontario Waste Management Corporation will be headed by a board of directors consisting of two representatives from the general public, two members of the local community, two technical experts and a chairman appointed by the government. They will be responsible for overseeing the development of the facility.

As chairman of the new corporation Dr. Parrott named noted Ontario environmentalist Donald A. Chant. Dr. Chant accepted the position on the condition that the preliminary geological survey findings be confirmed by field studies.

Because of the urgent need for the facility and because of the dependence of human and environmental health in Ontario on the establishment of an effective and sound industrial waste treatment facility, Dr. Parrott came to another difficult decision.

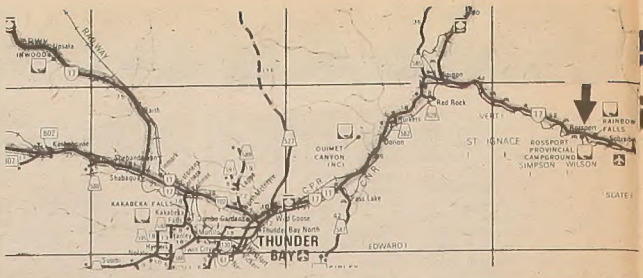
"Since the final decision on site location and initial solidification technology is made, no hearings will be held under The Environmental Assessment Act or The Expropriation Act on the few properties the government does not yet own." Dr. Parrott said.

This exemption is possible under The Environmental Assessment Act at the discretion of the Minister.

Dr. Parrott also announced that he would visit facilities in Europe to allow Ontario to inspect and improve on the latest in waste treatment technology, so that the Province will have the best facilities in the world.

Annie Todesco keeps the books project in Rossport's former general store.

Mrs. Livia Fournier moves one of the 30 ft. plastic pipe sections.



New water brings new

by Robert Koci

Romeo Bouchard's house stands partway up the slope that rises from the bay. Looking through the large livingroom window you can have an excellent view of Rossport, a small village 200 km east of Thunder Bay. There are two commercial fishing boats lying at their docks in the snug harbour protected by two large, well wooded, steep-shored islands. Neat houses and two churches stand along the few streets that make up the village. More are distributed along the slope that surrounds the bay.

In the harbour the sturdy government dock stands idle, but you know that from it you can see every stone on the bottom of the bay under 25 feet of crystal-clear Lake Superior water.

There is quite a bit of activity going on in the village. Two groups of people, all wearing yellow hardhats and well-worn overalls, are busy digging ditches, unloading 30-foot lengths of 4-inch pipe and machinery from a small panel truck. And when you look a bit closer you discover that about half of the workforce consists of women.

"That is not unusual," explains Frank Wright of Environment Ontario's Thunder Bay regional office. "In fact, during the past months the women, ranging in age from their twenties to past retirement, formed the best working crews.

"And they were at it all summer and through the first snowfall of autumn..."

"It" is the construction of a complete new water supply system for Rossport, a system that will provide 670 litres (150 Imperial gallons) daily to every one of the 150 villagers. The system involves the construction of a water intake at 11 metres (35 feet) of depth and 300 metres (1,000 feet) from the shore, the laying of about 4,000 metres (12,000 feet) of 100-millimetre (4-inch) watermain, service connections to the homes, the installation of pumps and the construction of a simple pumphouse complete with chlorination system. With the exception of the water intake and the installation of the pumps everything else was done by the villagers.

Ontario assists financially

Financial assistance is provided by Environment Ontario's program of grants for the updating of water and sewage works in small communities.

The start of the program in 1978 signalled the beginning of the end of Rossport's 10-year struggle for clean water.

The community's old water supply system was built in 1911 by the railway, primarily to provide water for the boilers of its steam locomotives. The water was taken from a small pond dammed up in the hills rising behind the village.

During following decades, Rossporters tapped this water pipe to bring water to their kitchens. When the railway stopped using steam locomotives it also lost interest in the water supply and the system deteriorated. The haphazardly strung pipes either rusted out or were plugged with sediments. The quality of the water suffered as aquatic life of all sorts grew in the pond.

About 10 years ago the Rossporters formed a water association, but the cost of a new system for the unorganized community prevented all action.

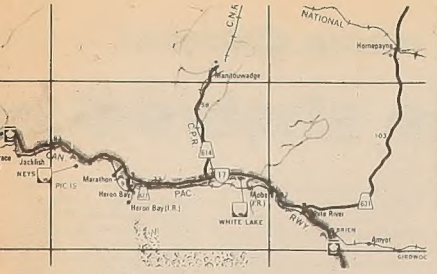
Then Environment Ontario's low-cost alternative program came along, providing 75 per cent of the cost of projects of this type, on top of the costs of engineering and design.

At first even the financing of the remaining 25 per cent seemed to create an impossible financial burden for the 50 families living in Rossport. But then somebody came up with the idea that the people themselves could supply all the labor and set a connection fee.

people supply labour

The ministry assessed the project and found it workable. It determined that water taken from the bottom of Lake Superior was much cleaner than water coming out of the old pond. The main obstacle of the project, the rocky character of the geology of the area, could be overcome by the use of well-insulated plastic pipe

View of a section of Rossport from the Government dock.



life to Rossport

(photos: R. Knel)

buried in shallow trenches in the thin layer of topsoil.

In the spring of 1980 Rossport started working and every able-bodied person in the village joined in — 90 per cent of the population. Everybody helped where he or she could help best. Nick Baine, equipment operator with the local Ministry of Transportation and

special equipment provided

Communications road crew, was put on the backhoe. Bob Fournier, retired, learned to weld plastic pipe with special equipment provided by the manufacturer. Larry Davis, engineering student, could do the project engineering supervision. Romeo Bouchard, superintendent of the MTC road crew, was the right man to organize the crews and assign jobs.

The rest of the population, including Mrs. Bouchard, Debbie MacLean, Livia Fournier and all the other housewives and their husbands and sons, supplied muscle and whatever else was needed to keep the job going. And then there is Mrs. Annie Todesco, the onetime schoolteacher who came to Rossport in its heyday 53 years ago as the bride of the general store owner.

The store was closed when Mr. Todesco died. But now it is again a hub of activity, mainly because, esconced behind an old wooden desk, Mrs. Todesco runs all the paperwork without which little can be accomplished in this day and age.

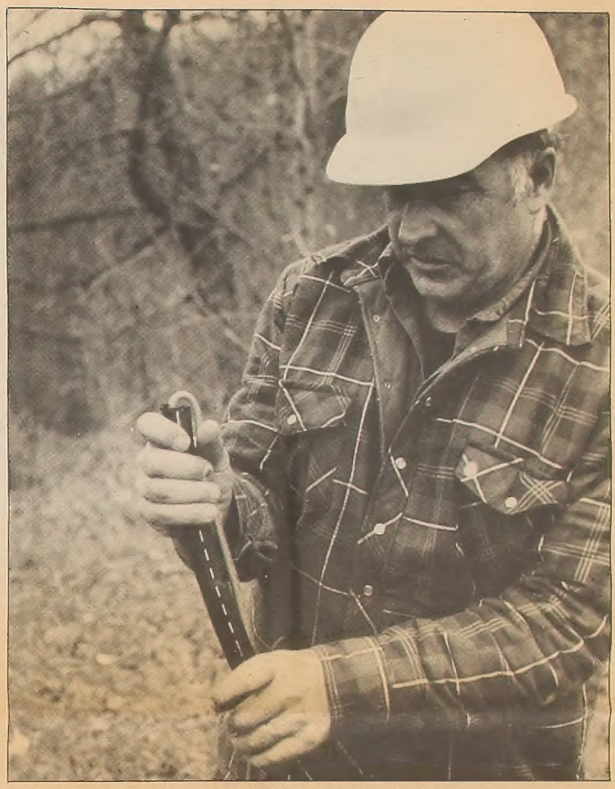
This includes ordering supplies and tools, rental and purchase of equipment and, mainly, payment of wages to the workforce, which is something that happens on paper only in most cases.

The workers get to see their paycheque and to endorse it. Then it goes directly to the water association, to make up the missing 25 per cent of the cost. There will be over 500 hours of work put into the project.

When the water taps are opened some time this winter and water starts to flow through the pipes, there may even be money left over.

But the Village of Rossport may need that. Since work on the new water supply system started, the promise of good water for kitchens and bathrooms has attracted new residents.

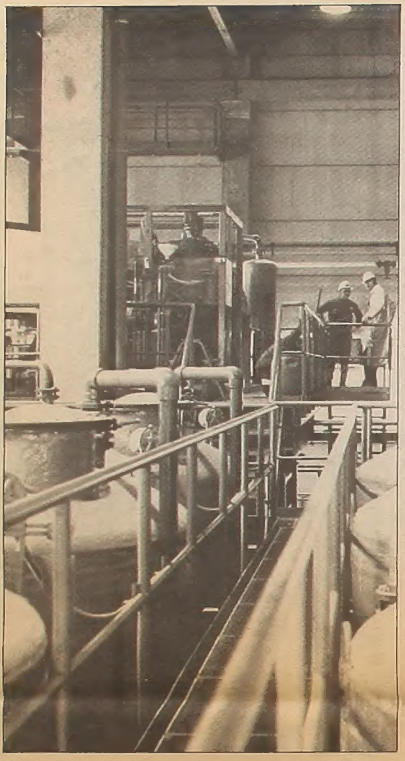
Five new homes were built in Rossport in 1980, and more are planned. It really looks as if the water supply will be more than just that. It may become the signal for a new start in the history of the once-lively community.



Romeo Bouchard, acting job foreman, places heating wire into the pipe

Mrs. Livia Fournier places foam insulation sections before joining two lengths of pipe.

Debbie MacLean explains the construction of the insulated pipe.



Chemical treatment plant. (photo: Mary Ellen Lewis)

Industrial waste disposal

Europe shows it c

In industrialized and crowded Europe, authorities had to come to terms with an acute problem of industrial waste disposal sooner than in Ontario.

In Bavaria, for example, the first special waste disposal system was established in 1968 in the Nuernberg-Schwabach area. In 1970 the Bavarian State, municipalities and industry co-operated to build a network of ten regional industrial waste collection points and three central special waste treatment facilities.

These treatment facilities operate on principles valid everywhere, and are based on the fact, that any chemical material, natural or man-made, can be chemically decomposed, neutralized or in some other way made safe for disposal.

In the Bavarian system, industrial waste that requires special treatment is first deposited at one of ten collection points. Here it is classified and, according to its composition, neutralized, de-watered, separated or thickened for transport to one of the central disposal facilities.

The central plants are well equipped with all equipment needed to treat a very wide range of chemical wastes. The plant at Ebenhausen, for example, is built on a four-hectare site in an industrial area.

It contains the following facilities:

A general-purpose section with a scale, a workshop and store-rooms; an administrative building housing offices, staff facilities and the fully-equipped central laboratory; an incinerator plant for liquid, semi-liquid and solid wastes; and a physical chemical treatment plant for alkaline solutions, acids, plating sludges, inorganic sludges containing chromium, cyanide and nitrates.

incineration at over 1000°C

The incinerator plant contains two rotary kilns kept at a minimum temperature of 1000°C, a steam generator and a flue gas scrubbing plant, a turbogenerator and all the requisite auxiliary installations.

The flue gas cleaning system consists of an electrostatic filter for separating out fine dusts and a two-stage scrubbing plant for removing chlorine, fluorine and SO_2 from the flue gases. The scrubbing water is recirculated and is treated in the physical chemical plant.

The steam which is produced is used to generate electrical energy for the plant's own use. The plant is self-sufficient in energy.

The control room and the power supply installations such as switchgear, a transformer, a turbogenerator, a feedwater treatment plant and a boiler are housed in a central building. The receiving bunkers for solid and semi-liquid wastes and the loaders for the rotary kilns are in buildings, while all the remaining parts of the plant are in the open.

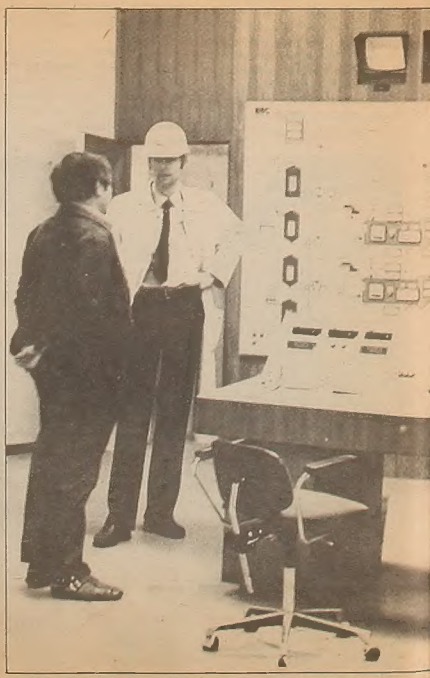
In the physical-chemical treatment plant, the materials are put in one of the 11 30m³ receiving tanks, depending on the results of the laboratory tests. These tanks lead into several storage tanks of the same capacity and, finally, to individual treatment plants consisting of mixing and dosing units.

Sludge residues are filtered in presses, the filter cakes are taken to landfill and the filtrate as well as other waste water is discharged to the receiving watercourse or to a sewage treatment plant after a final inspection.

sludge goes to landfill

After treatment, the residual treated waste, in the form of sludge, is transported to a 17-ha landfill site situated near the Munich-Stuttgart highway. The site is crossed by a layer of clay and loam between 8 and 18 m thick which prevents water from seeping into the lower groundwater table.

Receiving area for solid and pasty waste. (photo: Mary Ellen Lewis)



Plant operations manager Dr. Neukirch and one of the Ebenhausen p
cinerator control room.

an be done

The outer slopes of the site are continuously landscaped so that the appearance of the site is altered only for a relatively short time. The inner surface is covered with a clay/loam layer at least 40 cm thick which acts as a sealing material.

leachate is collected

The leachate is received by drainage courses with a filter gravel base placed about 2 m beneath the pit bed and, like the surface water, is conveyed to three retention tanks with a total capacity of about 20,000m³.

When a tank is full the water in it is inspected and, if found to be in satisfactory condition, is discharged to the receiving watercourse. If it does not meet the discharge requirements, it is returned to the plant for retreatment.

The groundwater is continuously monitored by sampling tubes reaching down to the lower groundwater table.

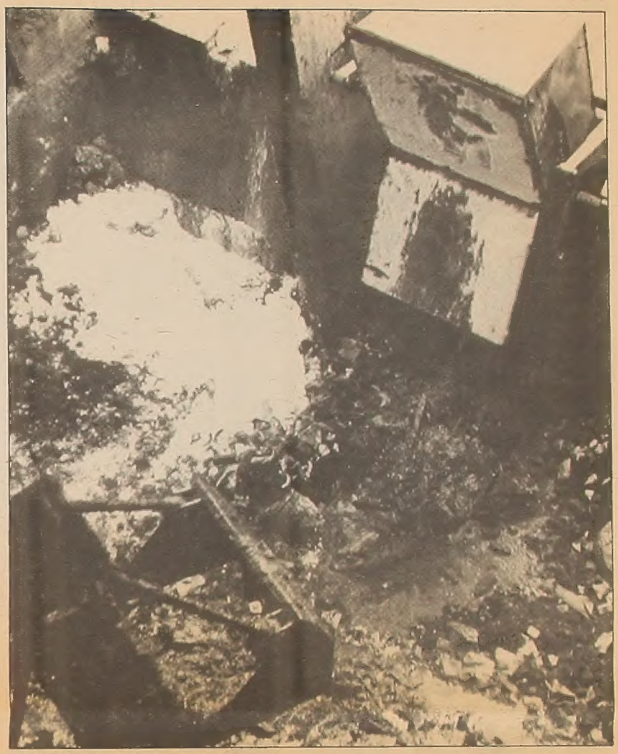
The landfill site for special wastes has a gross storage capacity of about 1.5 million m³ and will take about 15 to 20 years to fill. In addition, it includes an administrative building with an office, staff accommodation, a testing room, a shed for earth moving machinery and other vehicles and a vehicle weighing machine.

The disposal of industrial wastes is run in Bavaria by the non-profit Gesellschaft zur Beseitigung von Sondermuell GmbH, known as GSB. Forty per cent of the company's capital was provided by the state of Bavaria, 30 per cent by municipalities and 30 per cent by 97 companies of the chemical, metal processing, paper and oil industries of Bavaria.

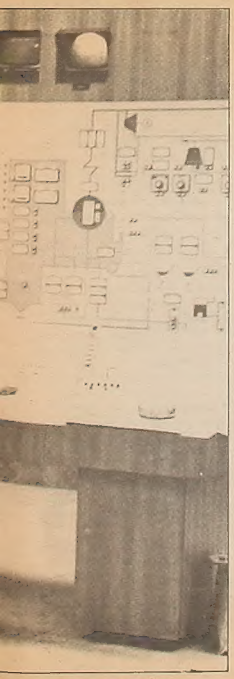
user industry pays costs

The operating costs of the system are recovered from charges to customer. These charges vary widely according to the type of material delivered for disposal.

A detailed price list lists 724 materials or groups of materials. The charges range from free (for combustible oils) to about $300 per ton. For some materials, like PCBs, materials containing arsenic, laboratory chemicals, pesticides and complex solutions, the price for disposal is established on the basis of a laboratory analysis. Additional charges are levied for laboratory analyses, for "correcting details given by customer," for very small amounts and for the treatment of containers.



Receiving bin for solid and pasty industrial waste. (photo: Mary Ellen Lewis)



ant's employees in the in- (photo: Mary Ellen Lewis)

(photo: courtesy Government of Bavaria)

Aerial view of the treated industrial waste landfill site. Its operation does not disturb adjacent agricultural fields.

The emissions from INCO's giant Sudbury stack are one of the problems environmental officer John Bassett has to deal with.

(photo: Tessa Buchan)

Regional ope
give on the s

by John Steele

Ontario has 412,582 square miles of natural environment. Nearly one third of that environment is water. The remaining land is so diverse that tractors are common in the relatively flat south, while in northern Ontario machines designed for crawling around on the moon have been tested.

Environment Ontario has 27 district and regional offices located in six geographical areas of the province. Nearly 1,000 men and women patrol and protect a chunk of real estate that takes three full days to traverse by car.

Ontario is one of Canada's most productive provinces. Many industries use her vast resources, transportation networks and manpower.

wondrous farm equipment

In southwestern Ontario, farm equipment of often wondrous design harvests the province's crops. In northern Ontario mining and pulp and paper companies struggle to tame the wilderness and harness the province's abundant resources.

Despite the hustle and bustle, Ontario can be serene and restful.

The Muskokas and the Haliburton areas of Ontario beckon to city dwellers to stop and rest beside their lakes and in their forests before returning to the cities.

"Every Environment Ontario office is different" said Bill Bidell, the ministry's assistant

Covering im

The immense distances of the north present other problems. An inspection of American Can's pulp mill in Marathon is half a day's journey by car from Thunder Bay. Trips to Dryden and Pickle Lake are considerably longer.

In southwestern Ontario regional staff in tune with the farming community must discuss manure handling problems, erosion difficulties and other rural pollution concerns. The Hamilton staff spends much of its time investigating the city's major employer, the steel industry.

"Isolation factors and the diverse nature of their work means we look for independent, self-reliant regional staff," said Mr. Bidell. "Regional staff must make some very important decisions on their own without be-

Protecting

The protection of the perennial playground of southern Ontario from environmental degradation falls on the men and women of the ministry's Muskoka-Haliburton office in Gravenhurst.

The area began catering to tourists before the turn of the century and environmental protection became important to local residents very early.

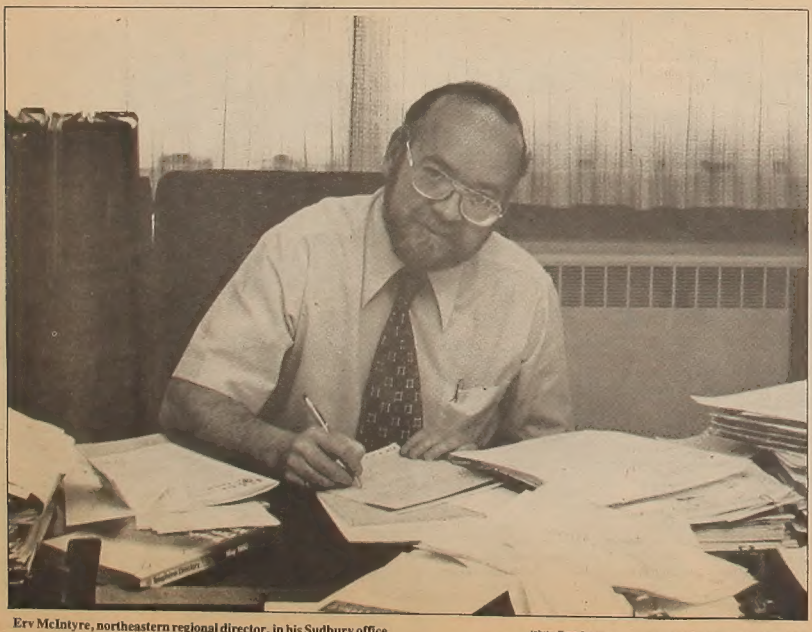
Working out of the district office in Gravenhurst and a sub-district office in Huntsville, 14 inspectors and five clerical staff spend most of their time on municipal or individual pollution-related problems.

"About 50 per cent of our time is spent on the inspection of septic tanks systems," said Frank Reinholz, the ministry's acting district officer for the Muskoka-Haliburton office. "In the remainder of the time we inspect sewage and water treatment systems, landfill sites, and educate the public about their environment."

It's a damp and chilly November day in Gravenhurst as Wayne Moore drives to inspect a septic tank site.

"This time of year we're pretty busy," said Moore, Environment Ontario inspector. "Everybody is hurrying to get the work completed before the first major snowfall and we must inspect the sites before they can be filled in."

He soon arrives at a 100-year-old one-room school house being converted into a community hall. Most of the week the community



Erv McIntyre, northeastern regional director, in his Sudbury office.

(photo: Tessa Buchan)

erations pot service

deputy minister in charge of regional and laboratory operations. "We don't seem to have a typical ministry employee either; they all seem to be as diverse in experience as the environment they are sworn to protect."

Regional industrial abatement staff from the ministry's two northern regions spend most of their time looking after pollution problems associated with the pulp and paper industry and mining companies.

nense distances

nefit of advice or consultation from head office or even, sometimes, their own regional offices."

Regional directors are often faced with major international problems right in their own backyards. Northeastern regional director Erv McIntyre has to deal with the corporate giant Inco right in Sudbury. Pollution problems associated with this corporation not only affect Sudbury but often send shock waves through the legislatures in Toronto, Ottawa and Washington.

"All of the ministry's regional directors must be tough and decisive and at the same time appreciate the sometimes sensitive economical and political climate in this province," said Bidell. "When I arrived here two years ago, I was thrilled to find the type of regional director I had inherited. Their knowledge and experience was a big help to me. It still is important today."

Not all of Environment Ontario's jobs are as glamorous as riding herd on Inco's pollution problems, but all are important. Gravenhurst district staff spend many hours inspecting the construction of septic tank systems. These important pollution control devices may not cost millions like Inco's scrubbers and superstacks, but they are a big investment for the weekend cottager.

The Kingston area regional staff spend lots of time inspecting water wells. For city dwellers, getting water is a simple matter. You turn a tap. In southeastern Ontario you often must dig a well first.

Contractor Jack Hoff (left) and environmental officer Wayne Moore inspect a septic tank system in the Gravenhurst area.

Ontario's playground

hall will be used sparingly but on Friday or Saturday it will be housing dances and dinners. An adequate septic tank system is essential in the renovating plans.

"Septic tank systems can cost anywhere from $1000 to $15,000

anxious contractor

and the contractors are anxious for us to inspect their work so they can go on with their business" said Wayne Moore. "Every extra day on the site means lost revenue for them. We're not dealing with large corporations, but with small contractors and weekend cottagers with limited funds."

The contractor, Jack Hoff, of Central Plumbing and Heating of Gravenhurst, arrived a few minutes later. After exchanging some good-natured kidding, both Moore and Hoff began the inspection. In about a half an hour it was completed and Hoff and his men began to fill in the weeping tile trenches with fill.

"They've done a pretty good job on this system" said Moore. "Most of the contractors have a good reputation around here, but some don't give a damn and see us as trouble makers. Our role is not only to protect the public's health and environment but also protect the public from bunglers and incompetents."

Wayne drives to the Gravenhurst sewage treatment plant to meet with the operator of the plant, Rolland Wiser. Rolland is relatively new at the job and depends on Wayne for advice and assistance.

Local staff from the ministry's Gravenhurst office have the technical information necessary in solving many problems. Ministry head office experts are only a phone call away in Toronto should their help be needed. The free consulting service can save smaller municipalities thousands of dollars.

Rolland's very clean sewage treatment plant runs smoothly, but in the late summer a problem with suspended solids called for the advice of both Wayne and Steve.

problems cleared

Black from the ministry's pollution control branch in Toronto. The problem has since been cleared up and Rolland appreciates the help he received.

Back at the office, some of the staff are patiently explaining environmental regulations to a local resident. Another staff member collects information for the completion of a high school project on acid rain.

The winters in the Muskoka-Haliburton area are spent up-dating records and in public education. In the public education program, held in schools, youngsters learn about their environment and how to protect it. Staff also collects snow samples and winter water samples from various lakes for the ministry's acid rain program and forwards them to Toronto for analysis.

closer to people

"Decentralization has certainly worked for my staff here in Gravenhurst," said acting district officer Frank Reinholz. "We are one step closer to the people we serve and we are part of a community trying to make it better."

Reinholz's staff play a valuable role in policy-making for the ministry. Hard and fast rules on septic tank installations often fall apart when faced with rugged terrain. Keeping head office policy makers aware of particular geological problems helps in the refining of guidelines for septic tank installations.

Nearly 100 years ago the Gravenhurst area began catering to tourists from all over the world. The men and women from Environment Ontario's Muskoka-Haliburton office make sure that this tradition continues for at least another 100 years.

Wayne Moore talks with Roland Wiser, Goavenhurst sewage treatment plant operator. (photo: John Steele)

In the Sarnia area the emission of gray or black smoke has become rare. Plumes emitted from industrial plants are generally white and consist of water vapour.

(photo: Environment Ontario)

Sarnia — dealing with large industries

While in Muskoka-Haliburton and many other regions pollution control calls for painstakingly detailed work with a great number of individuals, in other areas the pollution control officer has to deal with relatively few but often very large organizations.

Sarnia is a good example of such a situation. The city's development as the main centre of Canada's chemical industry goes back about 100 years to the discovery of petroleum deposits in nearby Petrolia. The "liquid gold" from the first oilfields was refined in Sarnia.

During World War II the manufacture of synthetic rubber was established and soon other plants depending on petroleum products as raw material followed.

The effects were clearly visible in the city's sky.

"When I started work in Sarnia in 1968 with the air pollution control service of the Ministry of Health things were very much different than they are today," recalled Ian Robertson on the eve of his retirement after 12 years of service.

municipalities were responsible

"Up to then, clean air was the responsibility of municipalities, and most were reluctant to place restriction on industries they wanted to attract. Only Toronto, Hamilton, London and Peel County had full-time air pollution control officers."

In 1968 Ontario responded to growing environmental concerns and assigned pollution control to provincial authorities.

"In those times none of the industrial plants had anybody on staff who would worry about emissions or effluents," Robertson said. "We had to deal directly with company presidents or plant managers, which was often difficult when executive offices were located in the United States.

"We had, though, the support of the Lambton Industrial Society. That support and much hard work helped to gradually change the situation.

"Our main job was to sell Sarnia manufacturers the idea that clean air and clean water were important to their image in the eyes of the public."

In due time the companies reacted. Some changed their operations to less polluting fuels, others by rebuilding production lines, as Dow Chemicals did when it was discovered that its discharge of mercury was poisoning fish in Lake St. Clair.

Since the protection of the environment was entrusted to the Ontario Ministry of the Environment in 1972, the situation kept constantly improving. Most companies now have knowledgeable graduates of environmental science studies on their staffs.

more and better instrumentation

Instrumentation to measure pollutants in air and in water has improved in quantity and in quality. Since 1978 air quality in Sarnia is monitored round the clock and reported to the air resources branch in Toronto for incorporation into the Air Pollution Index.

In 1978, the first year of API measurement in Sarnia, the level of 32, at which industries are warned to prepare for a reduction of their production, was reached three times.

In 1979 the industries had to be alerted only twice and in 1980 only once. Since 1978, the API has never exceeded 50.

This improvement, Robertson recalls, was achieved with only rare recourse to court action. Industries found out their money could be better spent on pollution controls than on lawyers.

next stage: odour control

The main air pollution problem still existing in the area is the control of odors, Robertson said. Odors are difficult to restrict, partly because their effect is felt differently by different individuals, and partly because they are generally caused by minute quantities of materials in the parts per billion range and below.

In the future, more attention may have to be focussed on the control of effluents and on water quality, Robertson said. "Our ability to determine toxicity, to pinpoint the source of pollutants and to control them will have to catch up with our ability to detect them in unimaginably small quantities."

"After working in the field, mostly with company executives, in the past 12 years, I am confident that we will succeed," Robertson continued.

"The larger companies in our area and elsewhere have become conscious of what it takes to become a good corporate citizen and, after all, even the bosses have to breathe the air and live in the environment they create.

"Smaller outfits are, at times, more difficult to persuade. Money they must spend on pollution control generally comes out of the company owner's pocket. But they, too, are following the example of their larger competitors and customers and follow suit to make their contribution to a better environment."

Sudbury handles anything

by Ken Ballantyne

On a cool night in June, 1980 Fred Lalonde, senior evaluator with Environment Ontario's Sudbury office, was returning home from a party. It was about 2 a.m. and he was tired. Far ahead on the road he could see flashing lights. As he came closer he found a tanker-trailer overturned in the middle of the road. Diesel fuel was leaking out of the vehicle into a storm sewer.

Fred reacted quickly and called Les Fitz, the Sudbury district officer, and Les rushed to the scene. After evaluating the situation, both men began digging earth and piling it around the storm sewer outlet to stop the fuel from entering nearby Ramsay Lake.

Later, other passing motorists stopped, saw the problem and lent a hand.

At about 8 a.m. two very tired environmental officers left for home to get some sleep. They were replaced by environmental officers Rick Harris and Ray Potvin. By about 5 p.m. the ministry's and the oil company's clean up teams had most of the oil contained.

It took two more weeks to remove all the oil that had escaped through the storm sewer system to the bay of the adjacent lake.

Disasters of this type do not happen every day, but the staff of Environment Ontario's Northeastern Regional and district offices feel responsible for the quality of many thousand square miles of Northern Ontario environment and are prepared to handle, at any time, anything that could harm it or its people.

The Northeastern Region's operations are carried out through five offices covering the Sudbury, Timmins, Sault Ste. Marie, and North Bay districts and the Parry Sound area. The regional office is divided into five sections:

The abatement East and abatement West sections are responsible for the investigation of emissions from any sources and for the handling of contingencies and complaints of citizens about the quality of their air and water in their respective areas.

Fred Lalonde takes a sample from a lake outflow weir. (photo: John Steele)

The technical support section monitor air and water quality and is responsible for approvals and planning functions throughout the region.

In the air quality assessment unit, David Balsillie and his technical and analytical staff maintain and operate numerous monitoring devices to determine the ambient levels of various air pollutants.

Problems associated with soils and vegetation are handled by the plant pathology unit. Samples are collected and analyzed and the results are forwarded to abatement officers and to the party who requested the testing.

Nels Conroy and the water quality unit keep an eye on the region's surface and ground water quality and quantity by collecting water samples from wells, lakes and rivers and interpreting the analytical results.

The region's water and sewage treatment facilities are run by the utility operations section.

Bill Gibson and his staff aid in the design and construction and are directly responsible for the maintenance and operation of water and sewage treatment plants. They are in constant contact with plant operators to keep the facilities running smoothly.

An office of any magnitude could not function without administrative services. Jim Pomerleau takes great pride in the efficiency of his staff and in their handling a wide range of responsibilities — from the distribution of pay-cheques to the counselling of staff members before retirement.

Combine all these elements and stir with Director Erv McIntyre and you have one of the most effective environmental offices in Ontario.

Old mines can be reclaimed

Abstract of a paper by J.E. Duignan and J.R. Hawley presented at the Technology Transfer Conference No. 1 in November 1980 in Toronto.

The completion of documenting abandoned mining operations in the province, and the determination of the environmental impact of these properties, will allow Environment Ontario's abandoned mines program to enter a new phase in 1981 — the reclamation of thousands of acres of sterile waste land and their transformation into an acceptable part of the environment.

The roots of Ontario's mining industry can be traced to 1770, when Jesuit Fathers began working with native copper at Mamainse Point on the east shore of Lake Superior. But it took nearly 200 years until growing public awareness prompted the Ontario government to deal with environmental problems caused by waste discharged from active mining operations and with the control of waste from large numbers of abandoned properties.

By 1978 an effective abatement program had been firmly established. Since this was entrusted in 1972 to the Ministry of the Environment, several major advances were made in areas such as acid mine drainage, the toxicity of mine-mill reagents, the design and siting of tailings disposal areas, and mine-mill waste water recycling.

In 1977 the ministry received funding from the Provincial Lottery Corporation to augment its abandoned mines program. This funding gave Ontario a running start on an extensive environmental program dealing with inactive mines. A report, The Chemical Characteristics of Mineral Tailings in the Province of Ontario, was also published with Lottery funding. It described for the first time the extent of the problem of abandoned mining operations and the specific contaminants involved.

Lottery provides funds

At the end of 1978 there were 17,073 acres of mineral tailings in the province associated with active mining operations and 7,694 acres that were regarded as abandoned. The active areas contained 741,252,000 tons of tailings while the abandoned areas contained an additional 336,100,000 tons. In total, at the end of 1978, in Ontario, 1,077,352,000 tons of tailings were contained in areas covering 24,767 acres.

Since then more than 100,000 tons of new tailings have been added each day and active tailings areas, when filled, are transferred to the "abandoned" category. The total volume of mineral tailings produced in Ontario from 1770 to 1978 (208 years) is now being produced in less than 28 years, and this rate is accelerating.

Poorly controlled tailings deposits can give rise to such environmental problems as:

- Leaching of contaminants from the tailings with subsequent impairment of downstream areas. Contaminants may include undesirable metals, acids, arsenic and radioisotopes.
- Deterioration of tailings areas. Tailings dams and structures may be weakened, or fail, and allow large volumes of contaminated sediment to be carried downstream. Wind can transport fine contaminated tailings material over long distances.
- Groundwater, vegetation and animal life may be contaminated.

Because of increases in metal prices and because less energy is required to process tailings than to process solid rock, many abandoned mines, especially gold mines, have been reopened and tailings are being reprocessed. Further attempts to re-use tailings are being considered, as additional supplies of non-renewable resources may be won by the extraction of residual minerals with new technologies.

The chemical and physical characteristics of any specific tailings deposit depend on the geology and mineralogy of the ore mined, and on the mining and milling methods used. Even within the same mining camp, the chemical and physical characteristics of individual tailings masses often vary widely.

Over the years, many instances of contaminated discharge from active and abandoned tailings deposits have been noted. In 1977 Environment Ontario began a concentrated effort to deal with the problem.

The program evolved in four stages:

- The documentation, location and ownership of all inactive and abandoned mines. More than 1,000 such properties are now known.
- The preliminary determination of the environmental impact of specific properties and the recommendation of remedial measures.
- The development of detailed environmental impact assessments for specific properties and the development of control technologies.
- The implementation of control measures at properties with provincial participation where the responsible party cannot be identified.

stage one completed

Stage one of the program was completed by the end of 1979, although changes in mine ownership create difficulty in keeping files current.

Stage two, the preliminary determination of the environmental impact of specific properties, is nearing completion. Since no data on the chemistry of specific tailings existed, the ministry had to generate its own data base by sampling and analyzing all accessible tailings. More than 4,000 individual analyses covering 32 different chemical parameters were amassed. The data acquired are used to indicate areas of potential environmental problems.

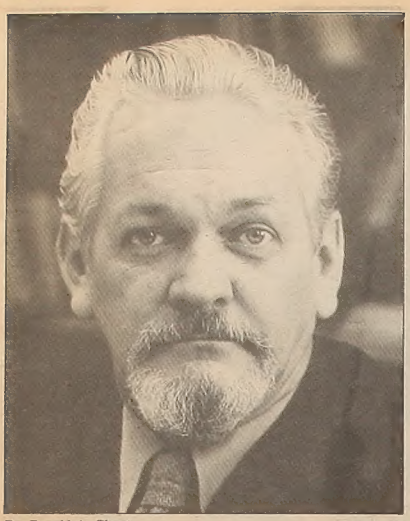
In the summer of 1980 the sampling program was extended to cover areas previously not sampled and to confirm prior results. These new samples will be used to determine the radiological characteristics of tailings masses, and in fact have already been subjected to preliminary gamma radiation screening. Proposed testing will confirm and supplement previous results.

Revegetation is one of the best means for rehabilitating old mines. For this reason, different varieties

(continued on pg. 12)

Abandoned open pit iron mine in northern Ontario. (photo: Environment Ontario)

Aerial view of an abandoned gold and silver mine in northwestern Ontario. The extent of leaching of material from the tailings into the adjacent lake water is clearly visible. (photo: Environment Ontario)



Dr. Donald A. Chant (photo: U. of T.)

Dr. Chant chairs new waste management corporation

Prof. Donald Alfred Chant, B.A., M.A., Ph.D., LL.D., F.R.E.S., F.R.S.C., F.E.S.C., chairman of the new Ontario Waste Management Corporation, is well known as one of Canada's leaders in the fight for a cleaner, healthier environment.

A native of Toronto, he graduated from the University of British Columbia with an M.A. degree in 1952. In 1956 he earned a Ph.D. in zoology from the University of London, England.

Prof. Chant started his career as a researcher in the study of insects and the development of safe alternatives to chemical pesticides. This work led to his appointment as chairman of the zoology department of the University of Toronto in 1967 and to his appointment as vice-president and provost of the university in 1975.

On completion of his five-year term as provost in 1980 he was appointed director of a joint study by the University of Toronto and the University of Guelph designed to determine the feasibility of a Canadian Institute of Toxicology. He also served as adjunct professor of zoology at the University of Guelph.

Prof. Chant did not limit his activities to entomology. Early in his career his attention was directed to the protection of the environment in general. In 1969 he founded and became chairman of Pollution Probe Foundation, and later chairman of the Ontario steering committee on Environmental Assessment Regulations.

In this position and as director of the Canadian Environmental Law Foundation he contributed decisively to the formulation of Ontario's Environmental Assessment Act. He became a member of the Environmental Assessment Board of Environment Ontario in 1976.

In recognition of his outstanding activity in zoology and in environmental protection, Prof. Chant received the University of British Columbia Award of Merit in 1970, the White Owl Conservation Award in 1973, and a honorary doctor of law degree from Dalhousie University in 1975. He was elected a Fellow of the Royal Society of Canada in 1979 and won the University of Toronto Alumni Faculty Award for academic excellence in 1980.

Prof. Chant has written or contributed to more than 70 scientific papers, seven books and numerous popular articles and reviews.

Support for source separation

Municipal commitment is all that's required to make recycling a reality in Halton, Environment Minister Harry C. Parrot told elected officials and senior staff of the region at a November workshop.

The special regional seminar in source separation at the Burlington Holiday Inn was told there would be provincial support for valid, effective recycling programs. "You come forward with your proposals and put me to the test."

Studies now under way in Halton give the region a head start on other Ontario communities, Dr. Parrott said. One, involving a proposed waste processing, energy recovery facility, and a second, investigating municipally-operated source separation, could combine with a new waste handling and landfill system to form a balanced waste management system.

Dr. Van Volkenburgh air resources director

The appointment of Dr. Gregg Van Volkenburgh as director of the ministry's air resources branch, effective January 1, 1981, has been announced by deputy minister Graham W.S. Scott, Q.C.

Dr. Van Volkenburgh has been supervisor of the technology development and appraisal section of the air resources branch since June 1979. He joined the ministry in 1977 as co-ordinator of the Naticoke Environmental Management Program, prior to which he held senior scientific positions in the aerospace industry in both Canada and the United States.

He received both his MSc and PhD in Space Sciences at York University, Downsview, graduating with his doctorate in 1973. He holds BA degrees in both chemistry and mathematics from the University of California, Irvine Campus.

Dr. Gregg Van Volkenburgh (photos: Tessa Buchan)

Mines rehabilitated

(continued from pg. 11)

of vegetation existing at tailings sites were sampled in 1978 and 1980 and analyzed for 23 different parameters. A report on the findings is being prepared.

With stages one and two of the project virtually completed, priority is being placed on reclamating those abandoned mines or tailings that pose immediate or potential hazards to human health or to established communities.

All materials found in tailings will eventually find their way into the environment. In most cases, this process may take hundreds or thousands of human life spans.

For the abandoned mines program to be practical, however, reclamation should be effective over much shorter periods of time, perhaps a century, with some exceptions.

The bulk of tailings masses in Ontario's hardrock mining districts consists of relatively stable silicates and oxides. The rehabilitation program concentrates on the control of mobile elements or substances that commonly occur in tailings in above-average or abnormal concentrations, such as sulphur and arsenic.

The unstable sulphur compounds commonly found in Ontario tailings can spontaneously liberate large amounts of sulphuric acid and associated metals. Such discharges are generally damaging and, coupled with acid rain, can give rise to regional acid problems.

Arsenic, commonly known in a variety of forms in Ontario tailings, is a mobile substance that responds only grudgingly to waste treatment.

Other problems are caused by the air or water transport of a variety of substances including asbestos; radionuclides such as radium and thorium; mercury, a heterogeneity of metals and nonmetals and a perplexing array of residual mine/mill reagents.

For the control of the impact of tailings on their immediate environment at a reasonable cost, the following steps are planned:

- The reclamation of derelict mining lands will largely be achieved by revegetation.
- The owner of the land involved, and not the public, will pay for the reclamation.
- Every attempt will be made to achieve a "walk-away" situation upon the completion of reclamation, a situation that requires no maintenance and no monitoring.

Reclamation by revegetation also present problems that are frequently overlooked. For instance:

- Many abandoned areas are remote. In extreme cases, seeding may have to be accomplished from aircraft.
- Revegetation can only be carried out routinely during a few weeks in the spring and perhaps a few weeks in the fall.
- It may take well over five years to produce a successful self-sustaining vegetative cover.
- Revegetation is a young science and gaps exist in its technology, particularly in the handling of acid tailings. The costs for the reclamation of all abandoned mining areas in Ontario is estimated at more than $125 million.

Up to now, jurisdiction in Ontario for the reclamation of mining properties has not rested with the Ministry of the Environment, but was based on The Ontario Mining Act, administered by the Ministry of Natural Resources. The waste management branch of Environment Ontario has, however, recently moved to transfer this jurisdiction to itself.

As a result, an all encompassing and specific program of reclamation should be possible in Ontario beginning early in 1981. This program is expected to include the following:

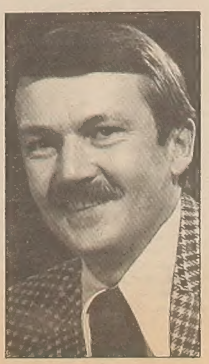
- All new, active, idle and abandoned mining operations should report to the Ministry of the Environment concerning their abandonment or reclamation programs.
- It is expected that property owners will plant and maintain vegetation or otherwise stabilize all despoiled areas on their property including mine tailings areas, waste rock disposal sites and any sites containing related debris.
- It is proposed that bonds be used to ensure that reclamation procedures are carried out as specified.

G. Mierzynski project director

George Mierzynski has been seconded temporarily from the ministry to assist Dr. Chant in the organization of the Ontario Waste Management Corporation as project director.

Mierzynski graduated from the University of Toronto with a B.Sc. in civil engineering in 1960. After graduation he joined the Department of Highways as a construction engineer. In this position he worked not only in construction but also in the computer field related to final pay programs to contractors.

In 1965 he joined the Ontario Water Resources Commission as a project engineer and was appointed supervisor of the construction branch in 1971. In 1974 he was appointed chief engineer and assistant director of the project co-ordination branch with the responsibility of managing the ministry's capital works program.



George Mierzynski